

CHAPTER 19

AVIATION FIRE-FIGHTING AND RESCUE TRAINING

Section I. Basic Fire-Fighting Training

RESPONSIBILITIES

Armywide, fire-fighting and rescue training for these duties are engineer responsibilities. On a fixed airfield where there is a fire department, the fire chief or marshal is responsible for training fire fighters and rescue crews. This includes auxiliary personnel. When there is no fire department or nearby engineer activity or when the nearest engineer activity is not staffed to provide training, the unit commander must ensure that adequate training is provided. He usually delegates this duty to the training officer. The training officer, or other assigned soldier, should work closely with the nearest fire chief and unit safety officer. The training officer is also responsible for keeping the motivation high. Endless variations can be used in training personnel. Actual use of assigned equipment on test fires is also effective in keeping motivation high during the routine aspects of the training program. The training program should include a training plan or outline that provides continuous training for all personnel. The training plan details and evaluates the scope, depth, and effectiveness of the training program. A guide to the subject matter and examples of practical exercises are described in the following sections.

BASICS OF FIRE-FIGHTING

Teach the basics of fire-fighting first. As new personnel come into the unit, repeat this training. In the tactical phase of training, review the basics and have the students practice with equipment. Teach personnel only a minimal amount of theory. Personnel, other than supervisors, need only enough theory to react intelligently to an emergency and for motivation. The subjects to be included in this phase of training are described below.

Hazards

Explain fuel, static electricity, and other sources of ignition as possible causes of fires. Emphasize the rate at which flames spread on aviation fuels. Also cover the ignition dangers of flammable, vapor-air mixtures. Teach aircraft safety including the hazard of rotor blades, the location and types of armaments carried on Army aircraft, the reaction of armaments in fires, and the dangers of approaching operating aircraft engines. Chapters 2 gives details.

Principles of Fire and Fire Extinguishing

Instruct personnel about the three elements required for fire, factors that contribute to the spread of fire, and the principles of fire extinguishing. They should understand which approach is appropriate for which type of fire at a refueling point. Chapter 2 gives more information on this area. For more detailed information, see TM 5-315. Keep the information simple; relate it directly to practical fire situations that personnel are most likely to experience in their duties.

Principles and Types of Fire Extinguishers

Discuss the different types of fire extinguishers that could be used in everyday operations. Explain the type or class of fire for which each is intended, the active agent or agents in each type of extinguisher, and the principle on which its effectiveness depends. For concise information, see Chapter 2. For more detailed information see TM 5-315. Include a brief review of extinguisher theory before actually using the extinguisher.

USE AND CARE OF EQUIPMENT

The common types of fire extinguishers used are dry chemical, CO₂, foam, and water. These are discussed in detail in Chapter 2. Demonstrate, using the proper technique, these fire extinguishers.

Demonstration and Practice Operation

Explain and demonstrate the operation of each type of fire extinguisher. After the explanation and demonstration, have personnel operate each type of extinguisher. Rotate personnel so that each will become thoroughly familiar with the fire extinguishers.

Demonstration and Practice of Application Technique

Demonstrate the proper technique for applying each available type of extinguisher agent to a fire. For each type, emphasize the discharge time of the model. After the explanation and demonstration, have personnel practice the proper application technique. Then, have personnel extinguish a fire. Warn them that petroleum fires may flare up when the extinguishing agent is first applied. Train personnel to work individually and as a team.

Practice of Extinguishing Class B Fires

Using staged fires, demonstrate the proper technique for extinguishing Class B fires. Have personnel practice extinguishing the fires described below. To practice, the following materials will be needed:

- Aviation fuel in a safety can (off-specification fuels may be used).
- One or more metal pans, tubs, or cut portions of 55-gallon drums, at least 18 inches in diameter and 4 inches deep.
- Shredded paper.
- Cans of water or a water source.
- Dry chemical, CO₂, or other appropriate extinguisher.
- Water extinguishers to be used by personnel being trained.
- One 15-pound CO₂ or 20-pound dry chemical fire extinguisher, and one 2 1/2-gallon water extinguisher for emergency use only.

NOTE: If there is no paved area on which these fires can be built, provide sufficient water or water extinguishers to use in case grass or brush catches fire.

••Practical fire 1. In a safe outdoor location, pour gasoline in a narrow strip (4 or 5 inches wide) about 5 feet long. Light one end using shredded paper. Then have personnel put out the fire.

••Practice fire 2. In a safe outdoor location, pour gasoline into a metal tub, pan, or drum; leave at least 1 inch between the fuel level and the top of the container. To save fuel, partially fill the container with water and then float gasoline on the water. If the fuel level in the container is too high, burning fuel could overflow during the training and cause a serious fire. Light the gasoline with shredded paper, and have personnel extinguish the fire.

••Practice fire 3. When water extinguishers are available, light shredded paper and a small amount of dry grass or brush on the ground in a safe outdoor location. Shield these materials from the wind, if necessary, to keep them from blowing around and starting an unplanned fire. Light the materials and let them kindle thoroughly. Have the personnel use the CO₂ or other Class B fire extinguisher until all visible flames are out. Usually, the fire will flare up again in a few moments. Then have personnel put it out with water extinguishers. This practice fire shows that an extinguisher for one class of fire is not necessarily effective on a fire of another class.

Practice of Extinguishing Class A Fires

Using staged fires, demonstrate the proper techniques for extinguishing Class A fires. Have personnel practice extinguishing the fires. The following materials will be needed:

- A metal wastebasket or similar metal container.
- Shredded paper.
- Dry grass or brush.
- Gasoline in a safety can.
- A metal pan, tub, or portion of a drum approximately 18 inches in diameter and 4 inches deep.
- One or more water-type extinguishers for use by trainees.
- One 2 1/2-gallon, water-based extinguisher and one 15-pound CO₂ or 20-pound dry chemical extinguisher for emergency use only.

NOTE: If there is no paved area on which these fires can be built, provide sufficient water or water extinguishers to use in case grass or brush catches fire.

- Practice fire 1. In a safe outdoor location, place shredded paper, dry grass, and small pieces of dry brush in the metal waste basket. Light the material with shredded paper, and allow it to kindle thoroughly. Have personnel put out the fire with the water-type extinguisher. See that they soak the material thoroughly and cool down the container to prevent the fire from rekindling.

- In a safe outdoor location, pour gasoline in the metal tub or pan or float gasoline on water in the tub. Leave at least 1 inch between the top of the fuel level and the top of the container. Light the gasoline with shredded paper and have personnel try to put the fire out with a water-type fire extinguisher. Usually they will not be able to extinguish the fire. Then have them try to put out the fire with a CO₂ or other fire extinguishers. This practice fire shows the unsuitability of most water extinguishers for petroleum fires.

Care of Equipment

Teach personnel to inspect fire extinguishers each day on reporting for duty. They should ensure that the fire extinguisher, or other equipment, is in place and that the pressure gage shows required pressure (on stored-pressure equipment). Periodic technical inspection, maintenance, and recharging or replacement are engineer responsibilities.

KNOWLEDGE OF LAYOUT

Train personnel to be familiar with all features of the airfield or refueling point. Teach them how to get to any specific location by the shortest route (in all kinds of weather and in darkness). Teach them where all fire and emergency equipment are located, where and how to shut off fuel flow, and where and how to give the alarm. If there is a water system on the field or site, teach them where outlets are and how to open them if necessary.

FIRST AID

Personnel who may be deployed at temporary forward area refueling or FARE system points should be given priority for first aid training. The training officer should check with the nearest medical activity to arrange for periodic first aid instruction to be given either by their medical personnel or a trained first aid instructor. If possible, a member of the unit involved in aircraft refueling should become qualified as a first aid instructor so that the training capability will exist within the unit. First aid procedures are in FM 21-11. Emphasize the first aid procedures most likely to be needed during refueling. These might include burns, smoke inhalation, moving injured personnel, and other fire-fighting and crash rescue first aid needs.

AIRCRAFT IDENTIFICATION

Personnel must recognize the aircraft that may use the refueling point. They should be able to identify each type of aircraft. Current Army aircraft are shown in Figure 19-1 thru 19-13. Explain to personnel that they must be thoroughly familiar with the various aircraft to fight a fire and rescue trapped personnel. In an emergency situation, they may be working in smoke, fumes, or in darkness. Have personnel train with actual aircraft whenever possible.

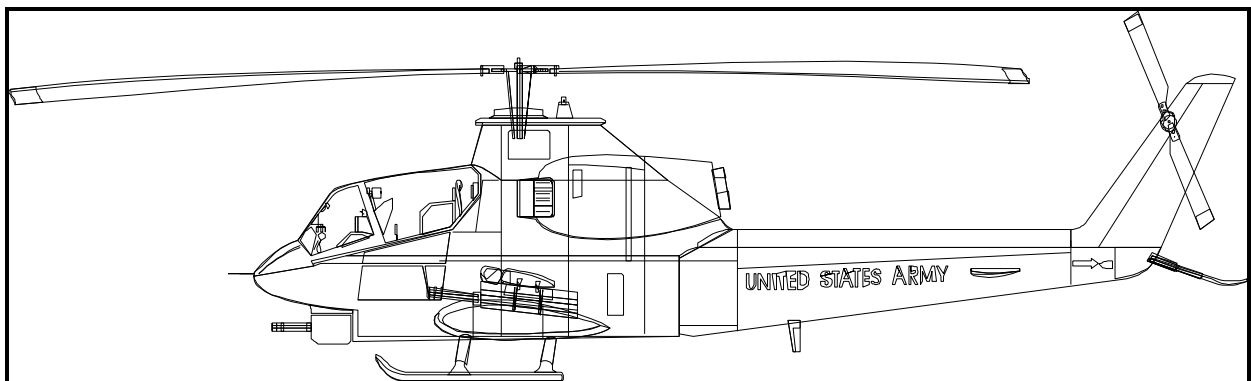


Figure 19-1. AH-1 (Cobra) attack helicopter

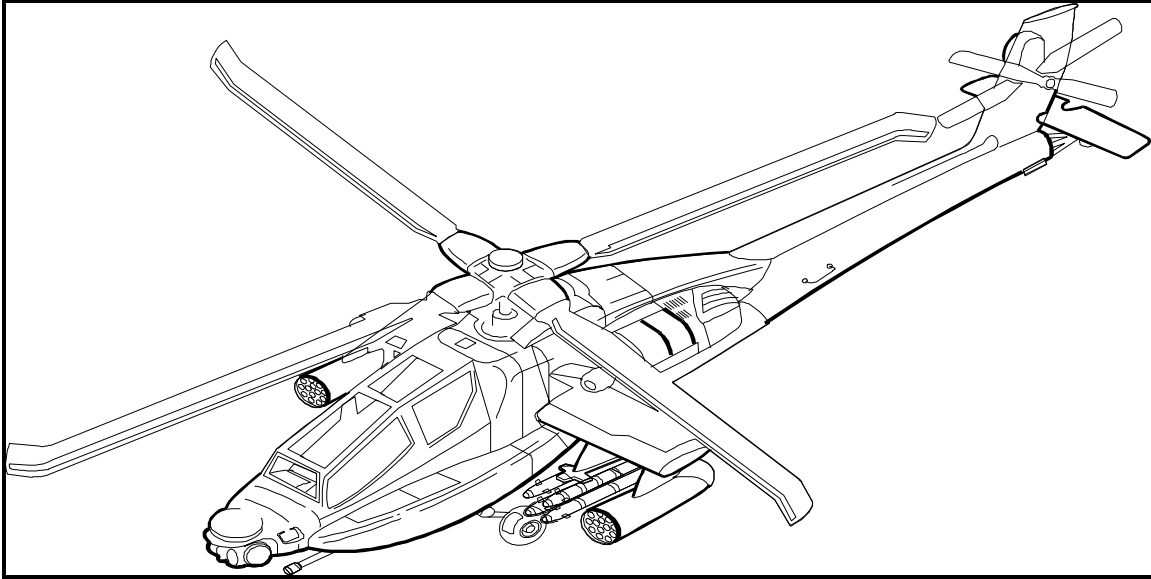


Figure 19-2. AH-64 (Apache) attack helicopter

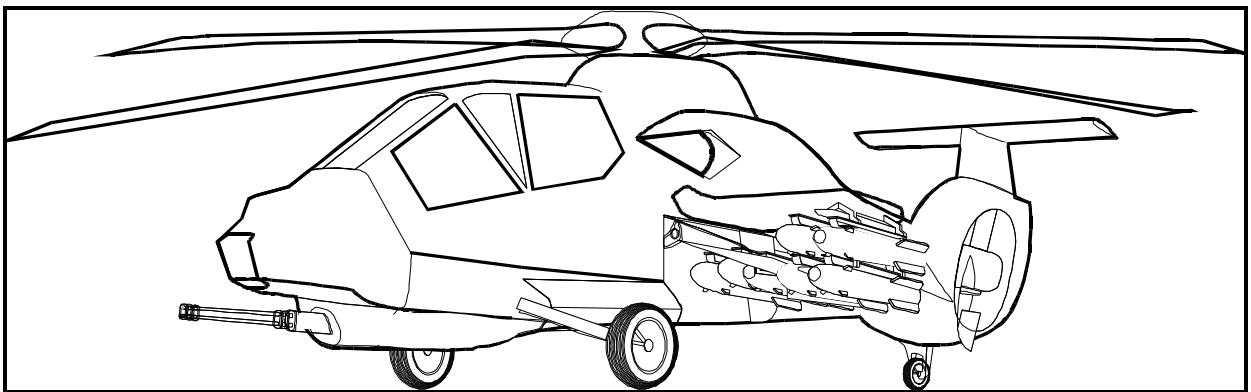


Figure 19-3. RAH-66 (Comanche) reconnaissance attack helicopter

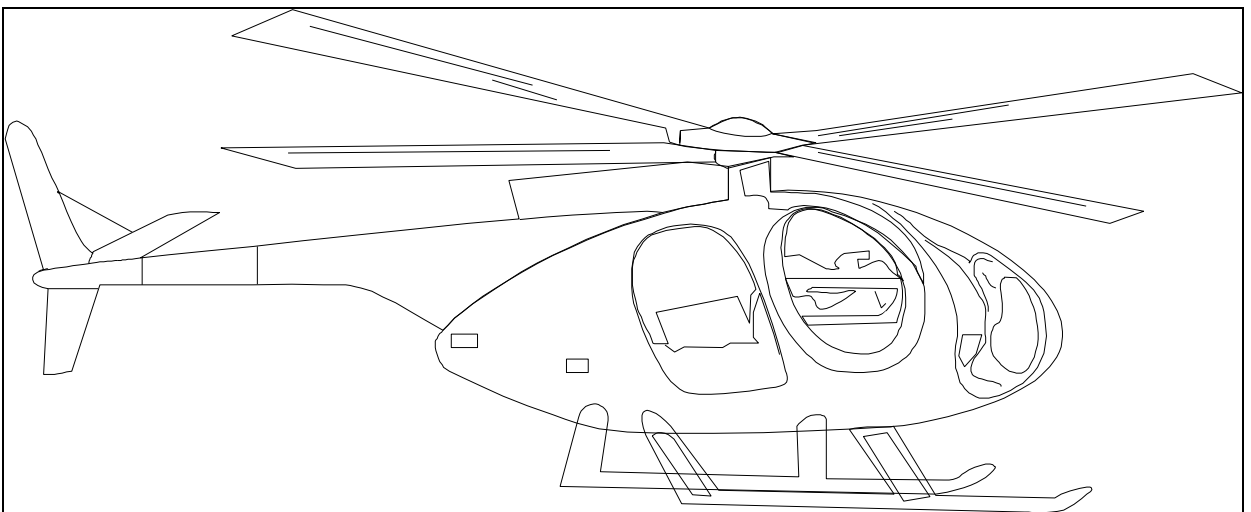


Figure 19-4. OH-6 (Cayuse) observation helicopter

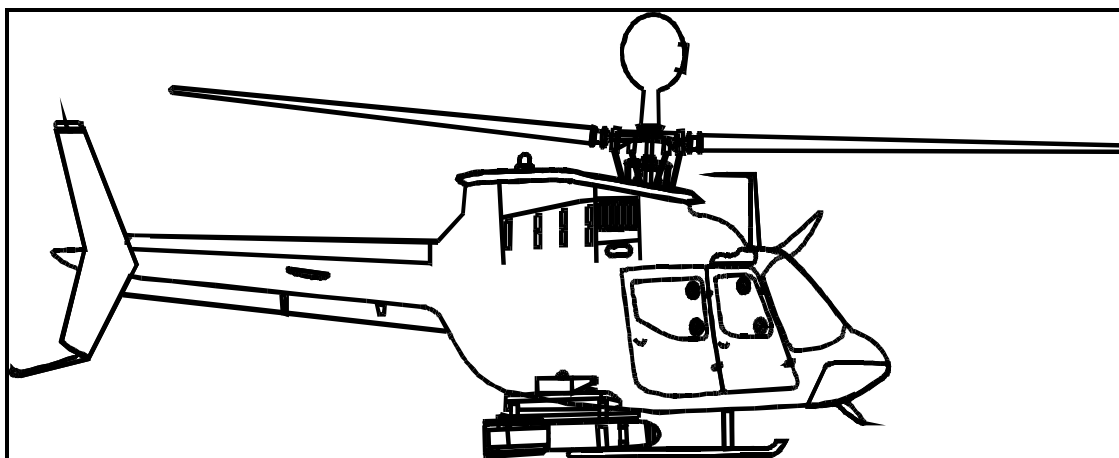


Figure 19-5. OH -58 (Kiowa) observation helicopter

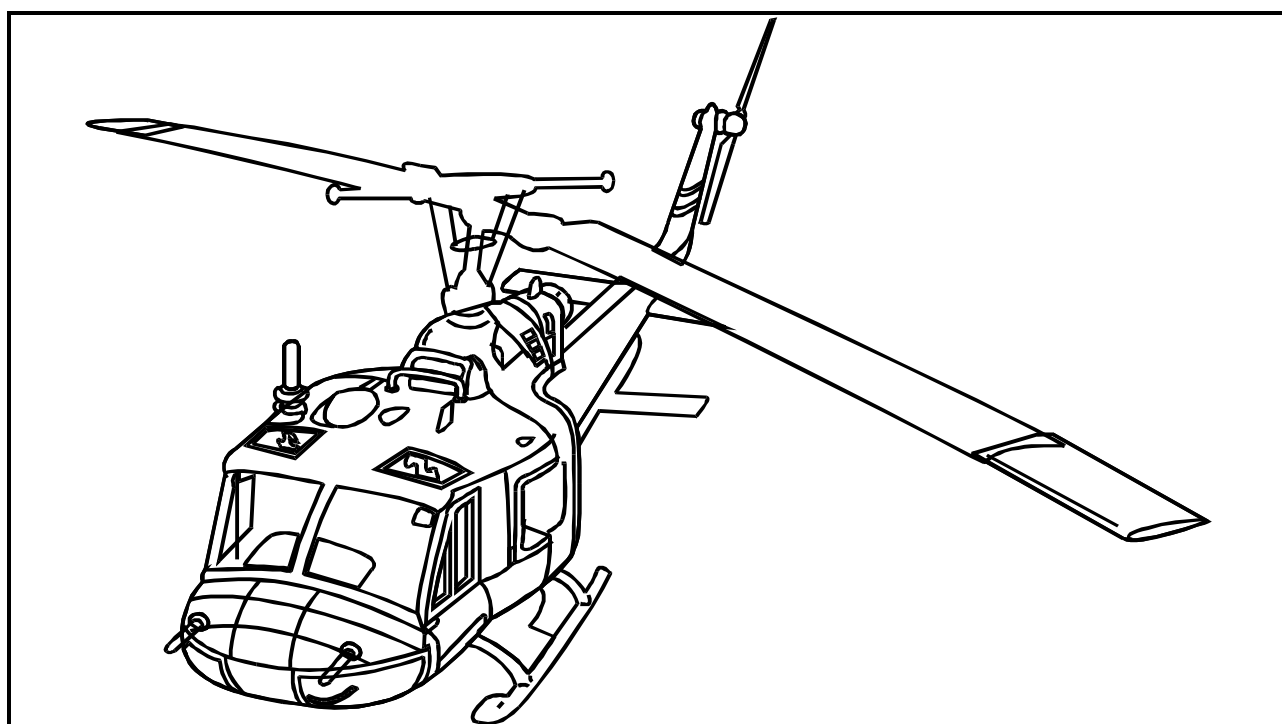


Figure 19-6. UH-1 (Iroquois or Huey) utility helicopter

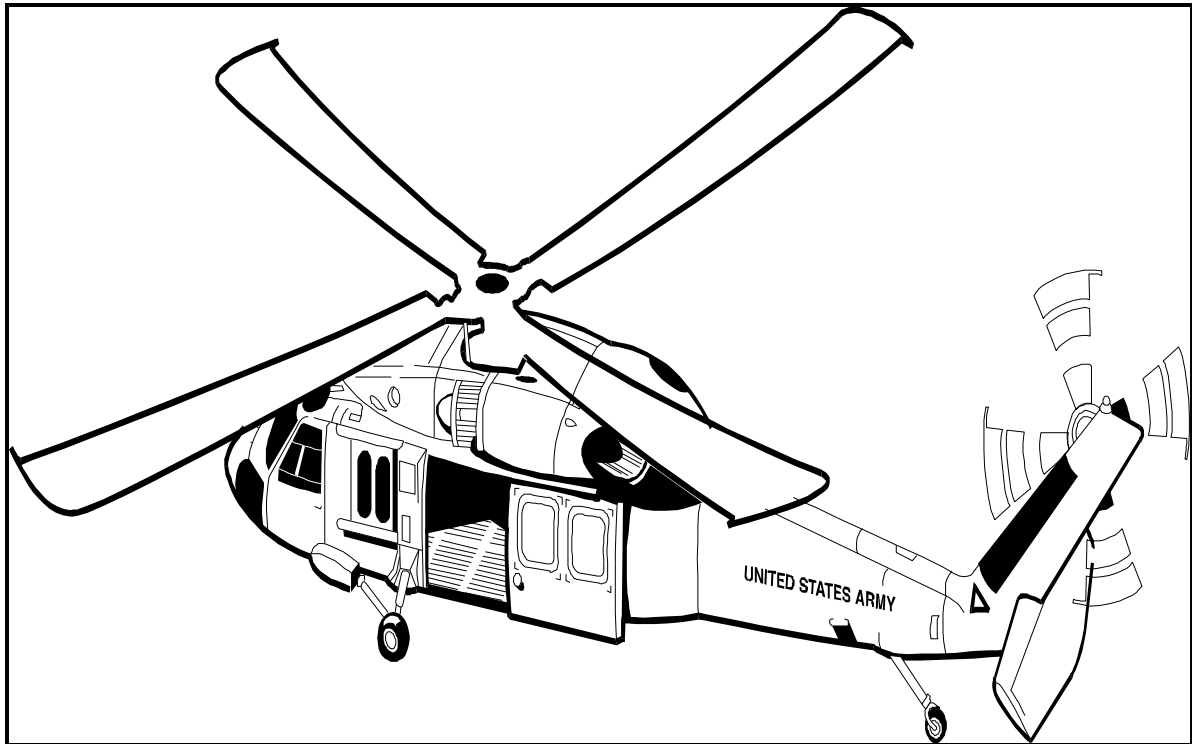


Figure 19-7. UH-60 (Blackhawk) utility helicopter

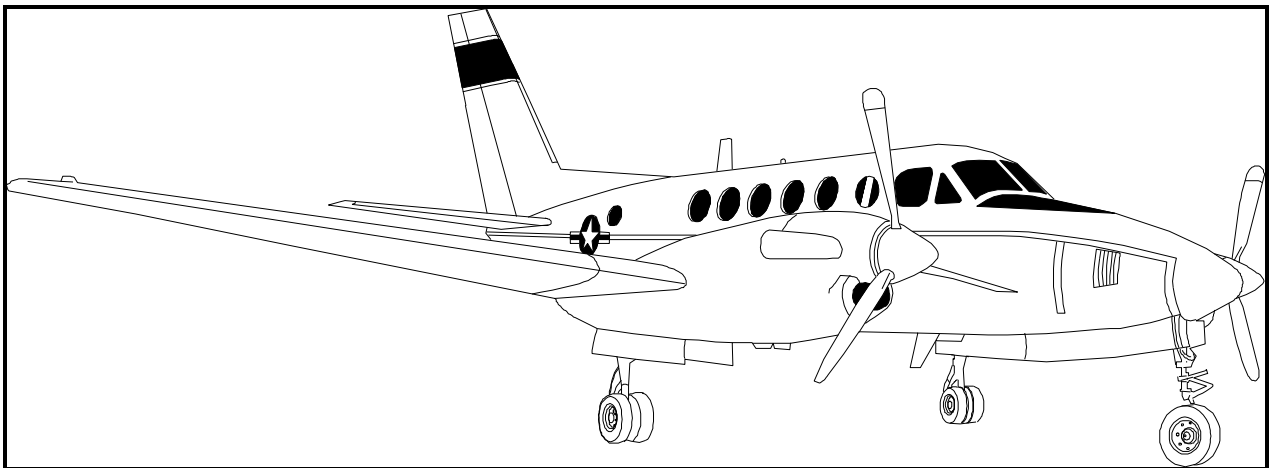


Figure 19-8. U-21 (Ute) operational aircraft

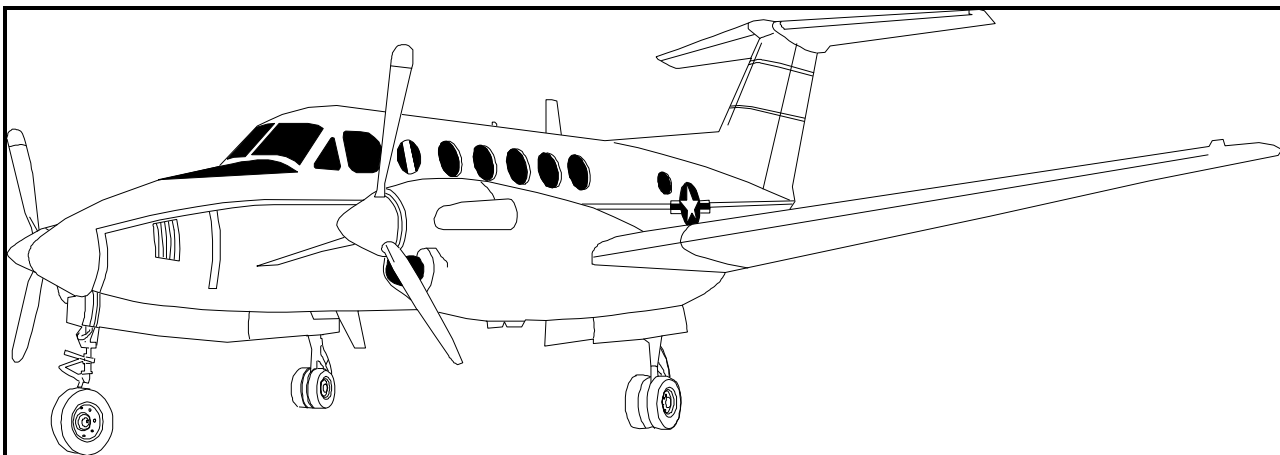


Figure 19-9. C-12 (Super King Air) light transport or surveillance aircraft

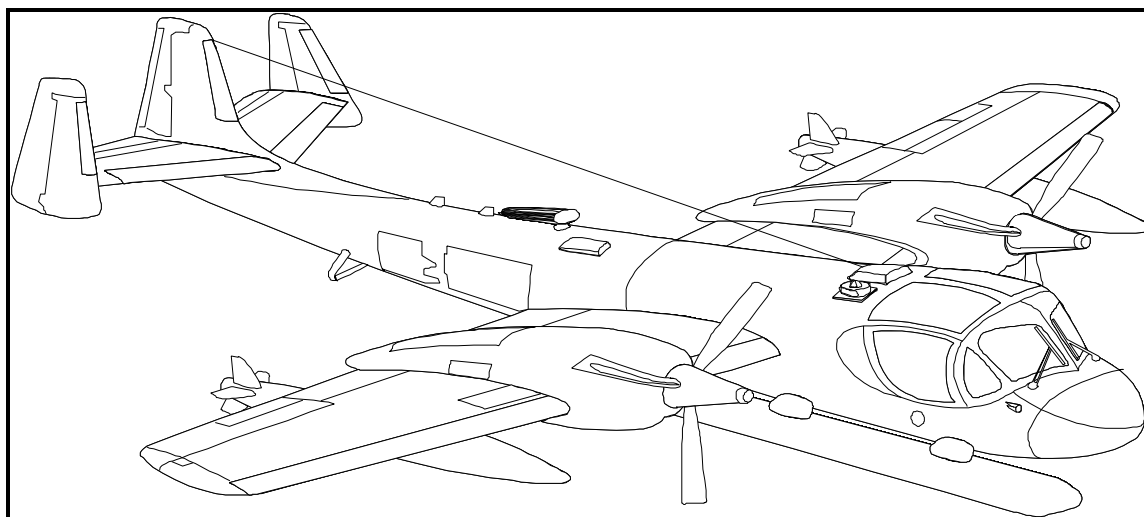


Figure 19-10. OV-1 (Mohawk) operational aircraft

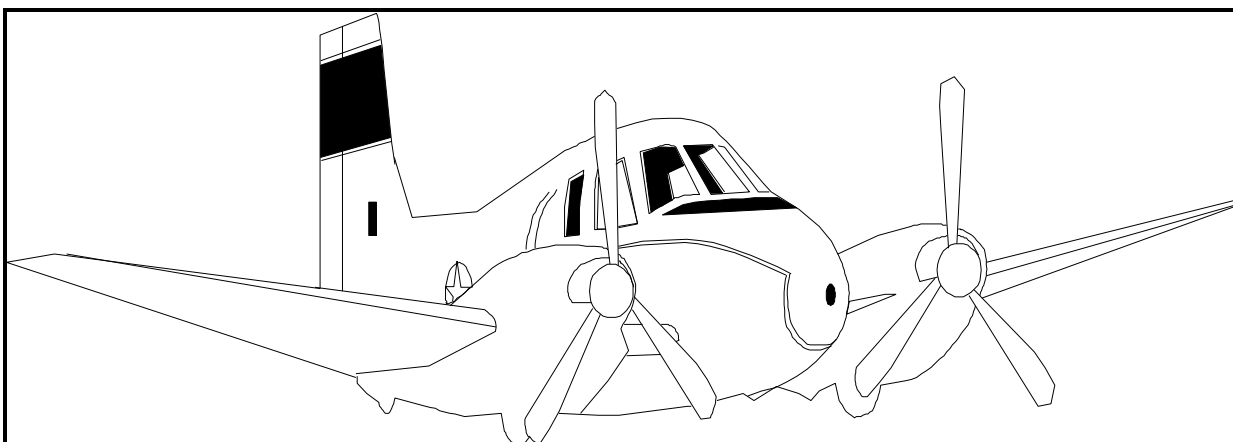


Figure 19-11. U-8 (Seminole) operational aircraft

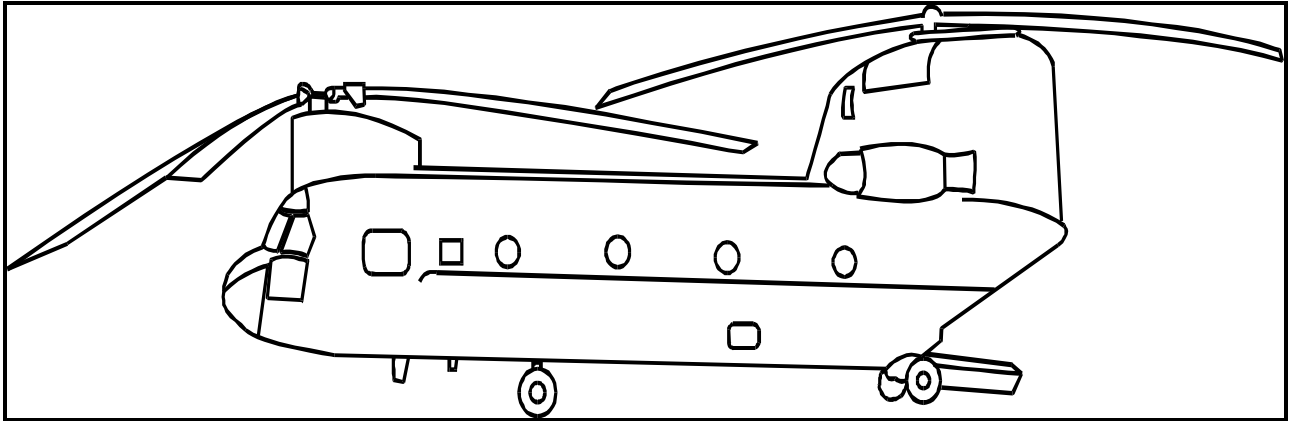


Figure 19-12. CH-47 (Chinook) cargo helicopter

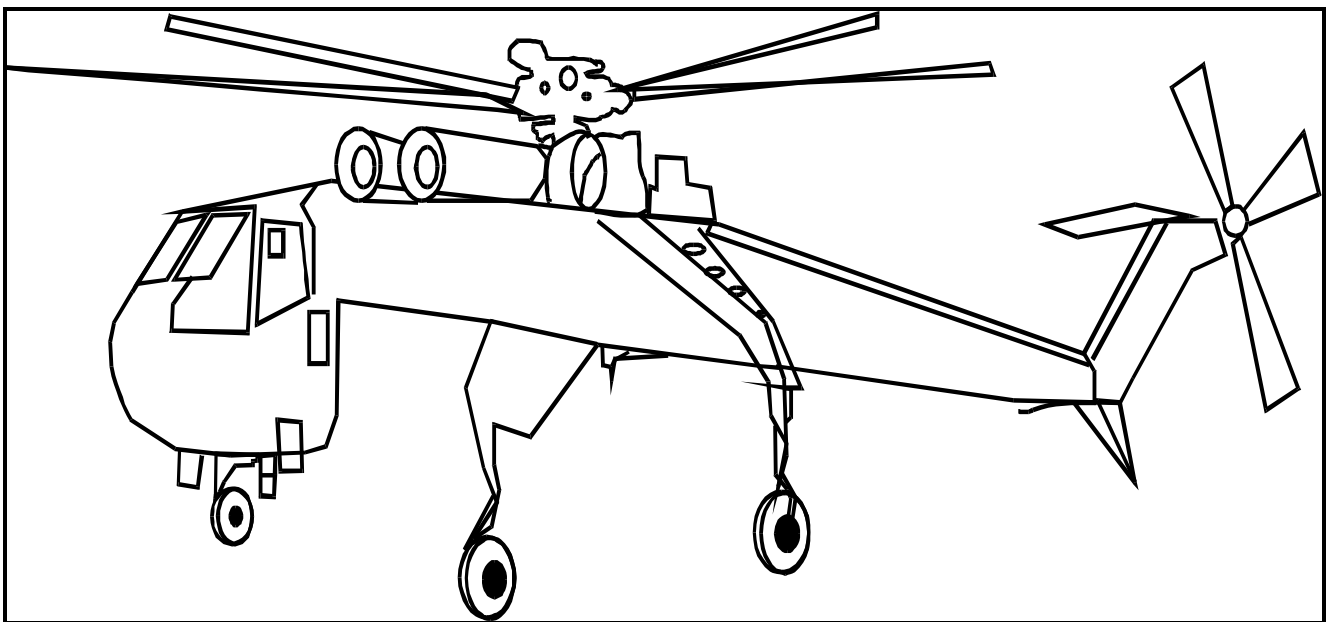


Figure 19-13. CH-54 (Tarhe or Flying Crane) cargo helicopter

Section II. Basic Crash Rescue Training

APPROACH AND ENTRY

No one should assume that an aircraft accident has been fatal to the aircrew. Fire is often a delayed result of a crash impact and, if the fire-fighting response is immediate, personnel in the aircraft may be rescued. Regardless of the extent of the fire or limited fire-fighting capability, fire-fighting and crash rescue operations should start immediately. Basic crash rescue training must be concerned with how to approach and get into the aircraft. Teach personnel about the principal hazards, including armaments and fuel, they will face when attempting an approach and entry. At semipermanent airfields, personnel should be familiar with fixed-wing aircraft as well as rotary-wing aircraft. They may need to know aircraft of other services also. At forward area refueling points, helicopter training should be emphasized.

Approach

The route of approach of the aircraft is determined by the position of personnel in the aircraft, the position of the armaments board, and the location of the fire and the wind direction if the aircraft is on fire. Use crash rescue charts (if available) to train personnel on the best method of approach to each type of aircraft. Use different fire and crash situations. When possible, train personnel using actual aircraft. Have personnel approach aircraft, identify location of personnel on board, and open exits.

Entry

Use crash rescue charts (if available), to teach personnel where the exits are and where personnel may be located in each type of aircraft. Familiarize them with every opening device both inside and outside the aircraft. Have personnel work the openings until they know them well enough to operate them effectively in darkness, smoke, or other conditions of low visibility. For detailed information on Army aircraft exits, see TM 5-315.

EVACUATION

Train personnel to decide whether the hazards of a situation are so great that the aircrews should be evacuated from the aircraft instantly or whether the fire should be fought first until help arrives to assist in rescue. Sometimes wreckage or twisted controls make it difficult or impossible to rescue personnel without help. Extreme care should be used in moving the injured. Train the personnel how to release the aircrew from safety belts, shoulder harnesses, parachutes, and ejection seats. Use the procedures described below.

Ejection Seats

Personnel must learn the correct release procedures for ejection seats. Use aircraft equipped with seats. A serious accident can occur if personnel release an ejection seat instead of a soldier. For example, to release the MK-J5D (Martin-Baker) ejection seat in the OH-1 (Mohawk) aircraft, use the manual override handle. See Figure 19-13. Squeeze the trigger and hand grip and pull the handle up and aft (toward the rear of the plane). This frees the soldier from the seat.

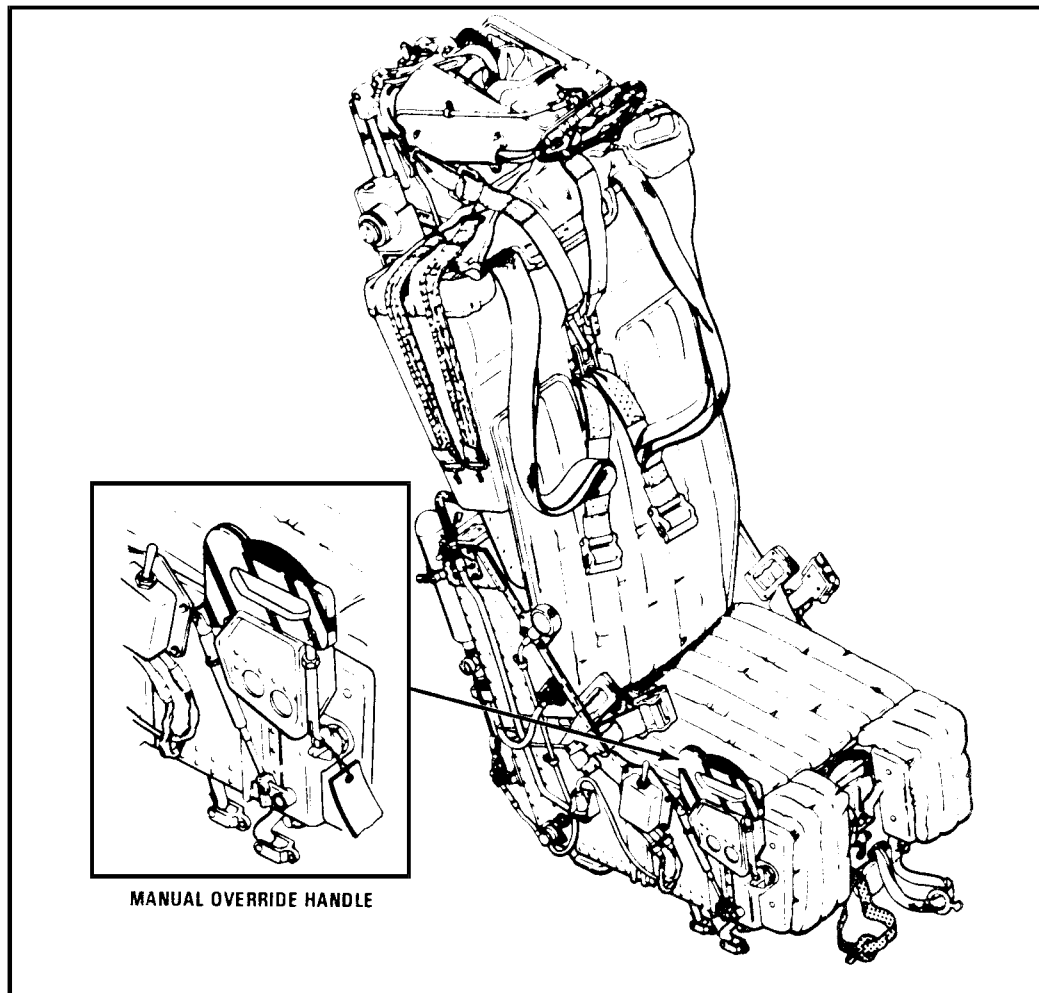


Figure 19-14. MK-J5D (Martin-Baker) ejection

Parachutes

The two basic types of parachutes used in Army fixed-wing aircraft are back type and the attachable chest type. The parachute harness may have either three clip-type fasteners as shown in Figure 19-15, page 19-11, or one quick-release box as shown in Figure 19-14. The parachute harness may also have one or two parachute canopy releases. Train personnel how to release any parachute harness equipment. When possible, have them release a soldier in an actual aircraft.

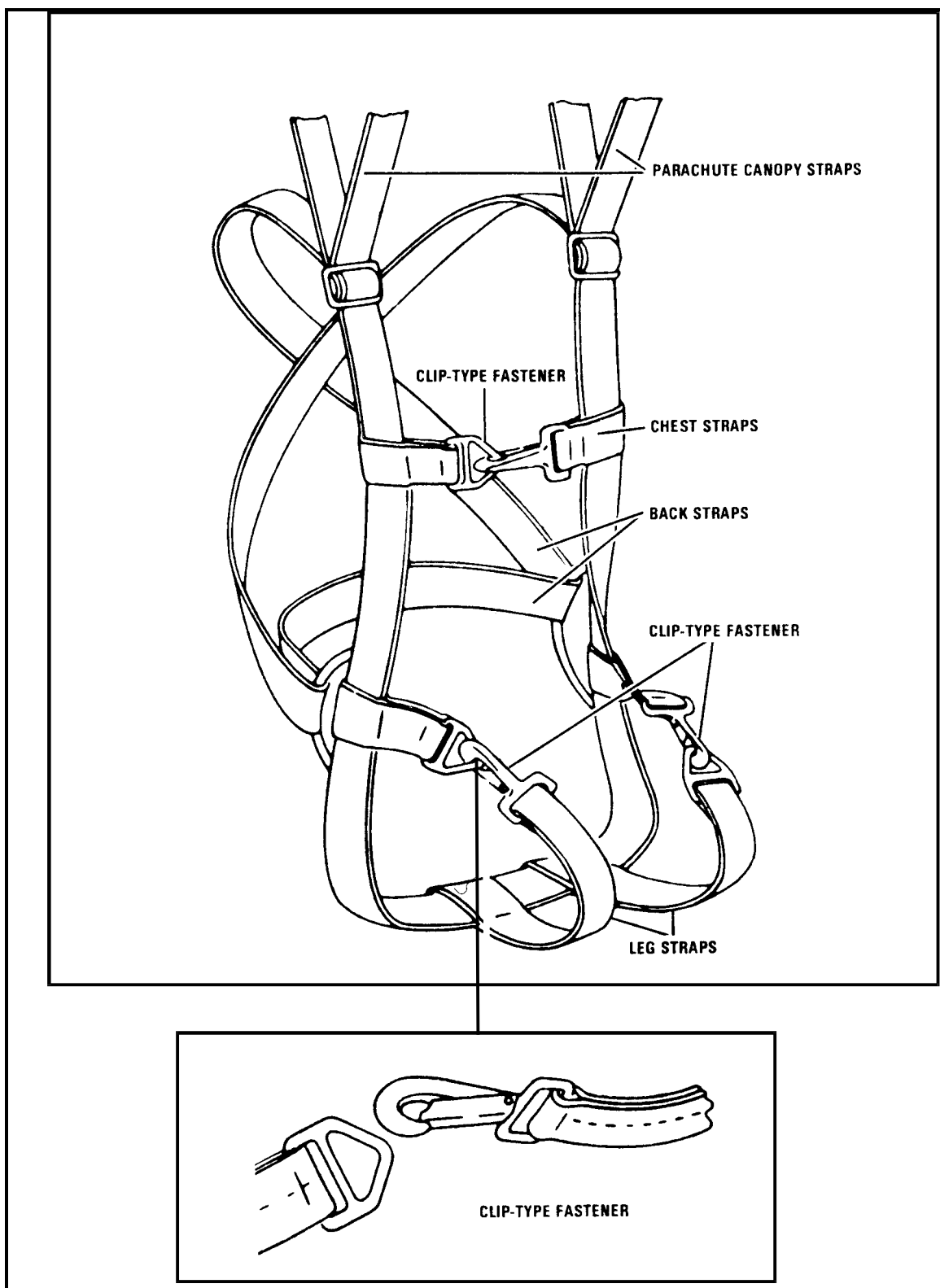


Figure 19-15. Parachute harness with clip-type fasteners

Removal of Injured Personnel

There is no substitute for actual experience in this phase of training. If you have an aircraft seat to use in training, have a soldier act as an unconscious victim (limp deadweight) and have the other personnel practice releasing and removing him from the seat. If possible, have a first aid instructor teach the best way of moving the victim. Teach personnel that it is always easiest to remove a soldier through the normal route in and out of the aircraft. Only if the door or canopy is jammed and impossible to open should rescuers try to enter and remove victims by another route. Whenever possible, practice with an actual aircraft to give personnel a chance to become familiar with the small space and limited approach and exit possibilities.

Section III. Tactical Fire-Fighting and Rescue Training

TACTICAL TRAINING

As soon as personnel have learned the basic fire-fighting and crash rescue procedures, they should be trained in the tactics of attacking various fires. Fires at refueling points can involve aircraft and petroleum, petroleum alone, and grass or brush. During tactical training, hot drills are performed. Tactical training should be directed toward developing speed, tactics of deployment, and the teamwork required to conduct successful fire-fighting and crash rescue operations. It also helps to teach conservation of fire extinguishing agents.

AIRCRAFT FIRES AND CRASHES

The tactical aim in fighting aircraft fires is, first, to make rescue possible and, second, to try to save the aircraft. The primary objective is to isolate the fuselage from the fire, cool it, and establish and maintain a fire-free escape route until all personnel are evacuated. When possible, build a sample fire in a crashed fuselage or build a mock-up to use so that personnel can practice with an actual fire. Described below are the basic procedures to follow when fighting an aircraft fire.

Approach the Scene

When mobile fire-fighting and rescue equipment is available, approach the fire or emergency by the fastest route. Stress to personnel that the fastest route may not be the shortest route. They must also consider route surfacing, weather conditions, and similar factors when determining the shortest route. Conduct timed runs to various locations on the airfield or refueling point to practice. Caution personnel in vehicles to be careful as they near the accident scene to avoid hitting personnel escaping from the fire or crash or injured personnel lying on the ground. Stress special care when an aircraft fire or crash is approached in the dark or under conditions of low visibility.

Position Equipment

Teach personnel where to position fire-fighting and rescue equipment (mobile or hand-held). Teach them to keep the following in mind:

- The equipment operator must be able to see the fire or wreck and its surroundings.
- The equipment must be positioned where it will not be engulfed in fire. On flat terrain, the best position is upwind. On a slope, the equipment must be placed up-slope from the fire or crash because both fuel and fuel vapors run downhill.
- No piece of equipment should block access to the fire or crash by other fire-fighting or rescue equipment.
- The equipment must be placed so that the fire can be fought effectively. If rescue is involved, the equipment must be positioned so that the flames can be kept away from trapped personnel and a safe escape route kept open until everyone is out of the aircraft.

Approach the Aircraft

Teach personnel that their approach to the aircraft and fire depends on their knowledge of the aircraft involved. This includes the location of exits, fuel tanks, armaments, and other flammable and explosives on board. Warn them that if the aircraft engine is operating that they must beware of rotor blades or propellers, turbine engine air intake and exhaust vents, and the effect of rotor or prop wash on the stream of a fire extinguishing agent.

Practice Rescue

Have personnel practice entering the aircraft and releasing and removing personnel.

Give First Aid

Simulate likely injuries and have personnel give first aid.

PETROLEUM FIRES

Train personnel in the tactics of approaching a petroleum fire that does not involve an aircraft. The principles of approach to a site and the positioning of equipment are the same as for an aircraft fire. Reemphasize that both fuel and fuel vapors flow downhill and that personnel must consider the danger of being engulfed by fire. Teach them that if the fire involves flowing fuel, the first thing to do is shut off the flow. Be sure each person knows where cutoffs are and how to close fuel nozzles and valves that shut down pumps. If there are emergency cutoffs, see that personnel know where they are and how to operate them. If possible, float some fuel on water in an empty berm and have personnel practice putting out the fire.

GRASS AND BRUSH FIRES

If fire extinguishers for Class A fires are available, train personnel how to fight grass and brush fires. Teach them to expect aircraft or petroleum fires to lead to grass or brush fire. Wind usually determines the direction in which a grass fire moves, so the best approach is from upwind. Usually the approach should start at the upwind edge and work around the sides of the fire. However, at a refueling point, personnel must consider the position of the fuel supply and of the aircraft in relationship to the wind and fire. Teach them that depending on the location of the fire and the speed of its advance it may be necessary to attack the fire from downwind or crosswind to cut it off from the fuel supply and aircraft.